



National Environment
and Planning Agency

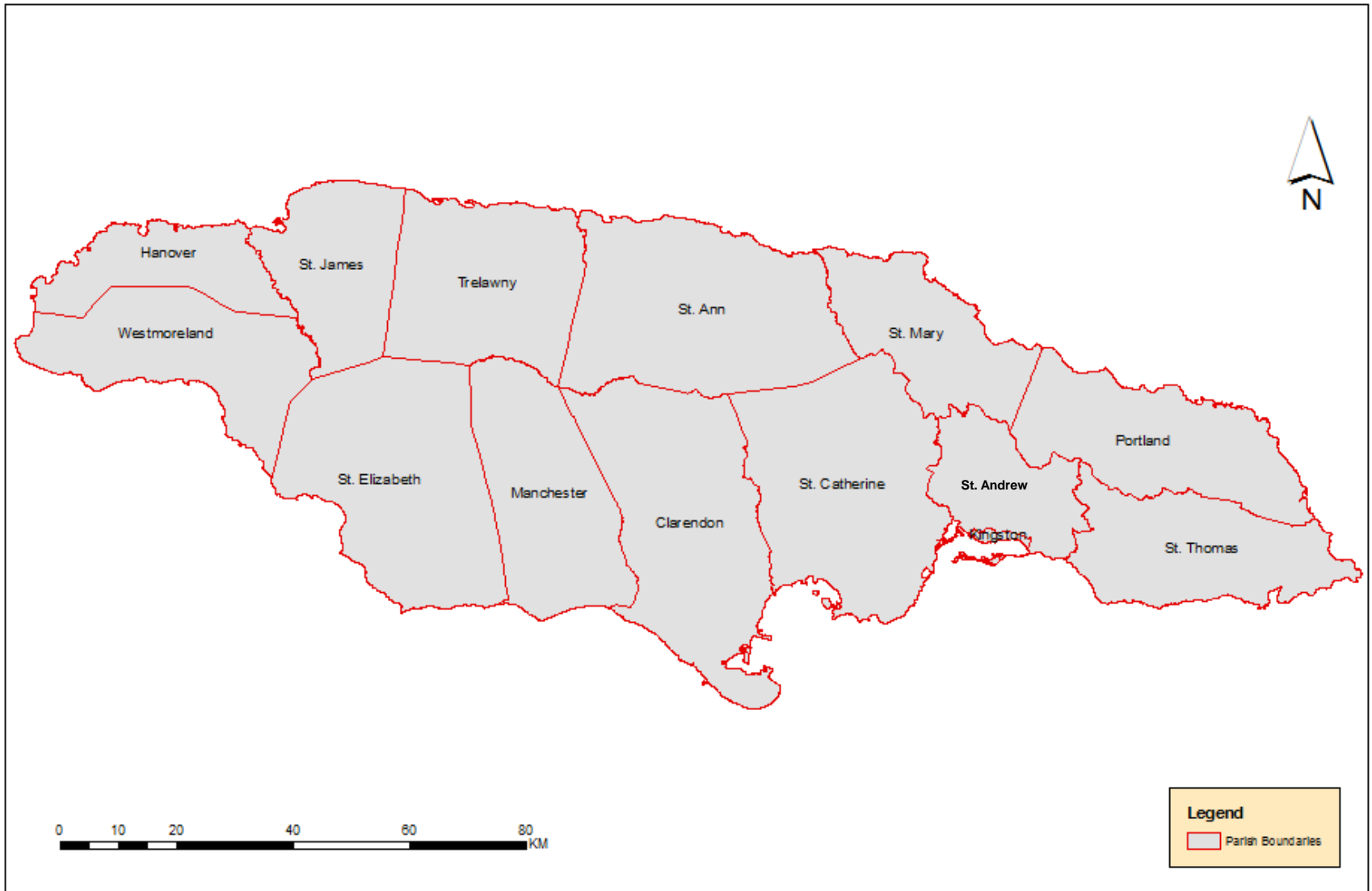
Nutrient Management using Wastewater and Sludge – Jamaica's Approach

Global Conference on Land-Ocean Connection
Building Bridges through Partnerships
Hilton Hotel, Rose Hall
Jamaica
2 – 4 October 2013

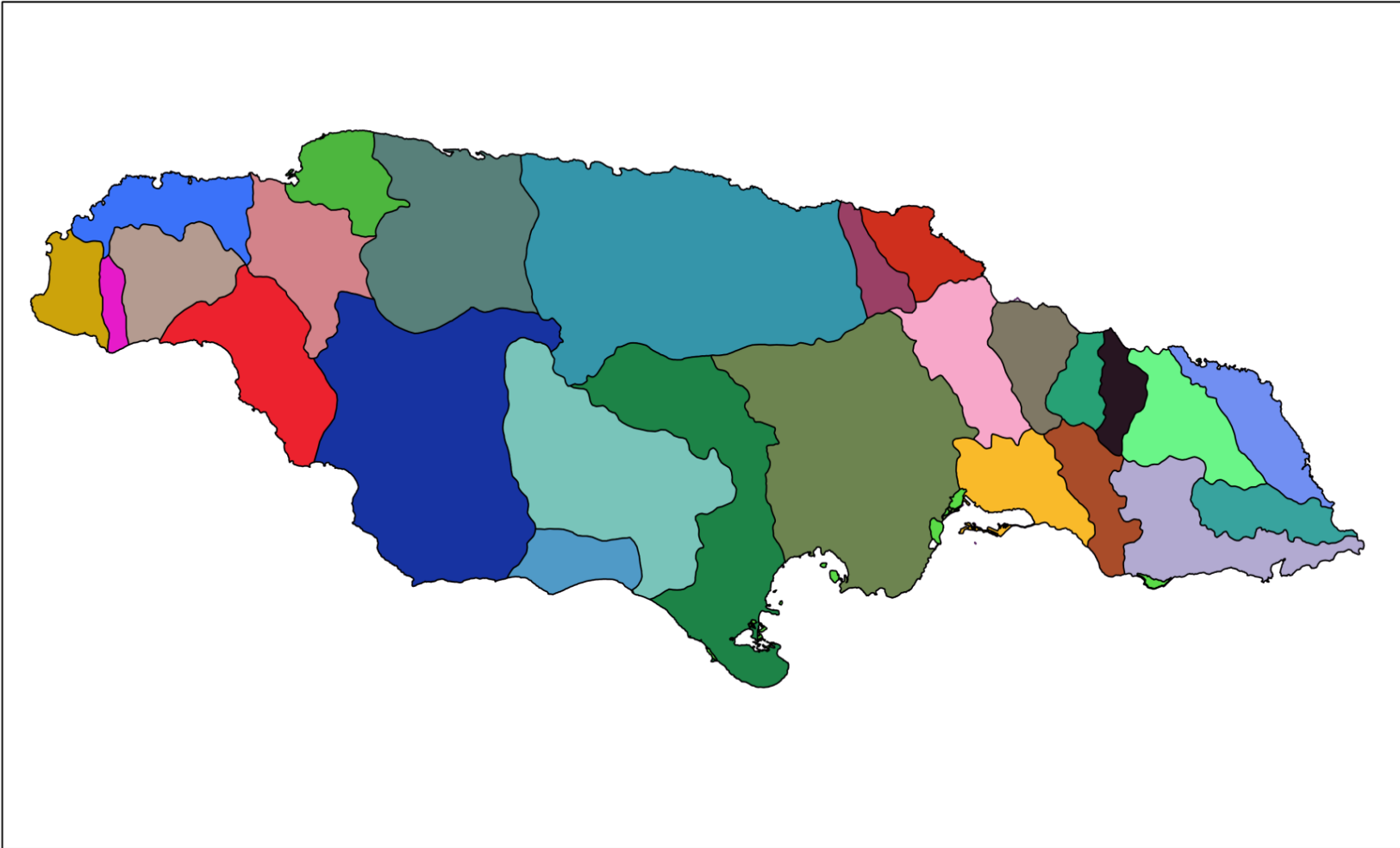
Overview

- Jamaica
- Context for Nutrient Management
- Value of Using Wastewater Products as Nutrient Source
- Initiatives And Actions Taken To Minimize Pollution of The Natural Resources
- Policy and Legislative Framework
- Factors for Consideration
- Nutrient Management

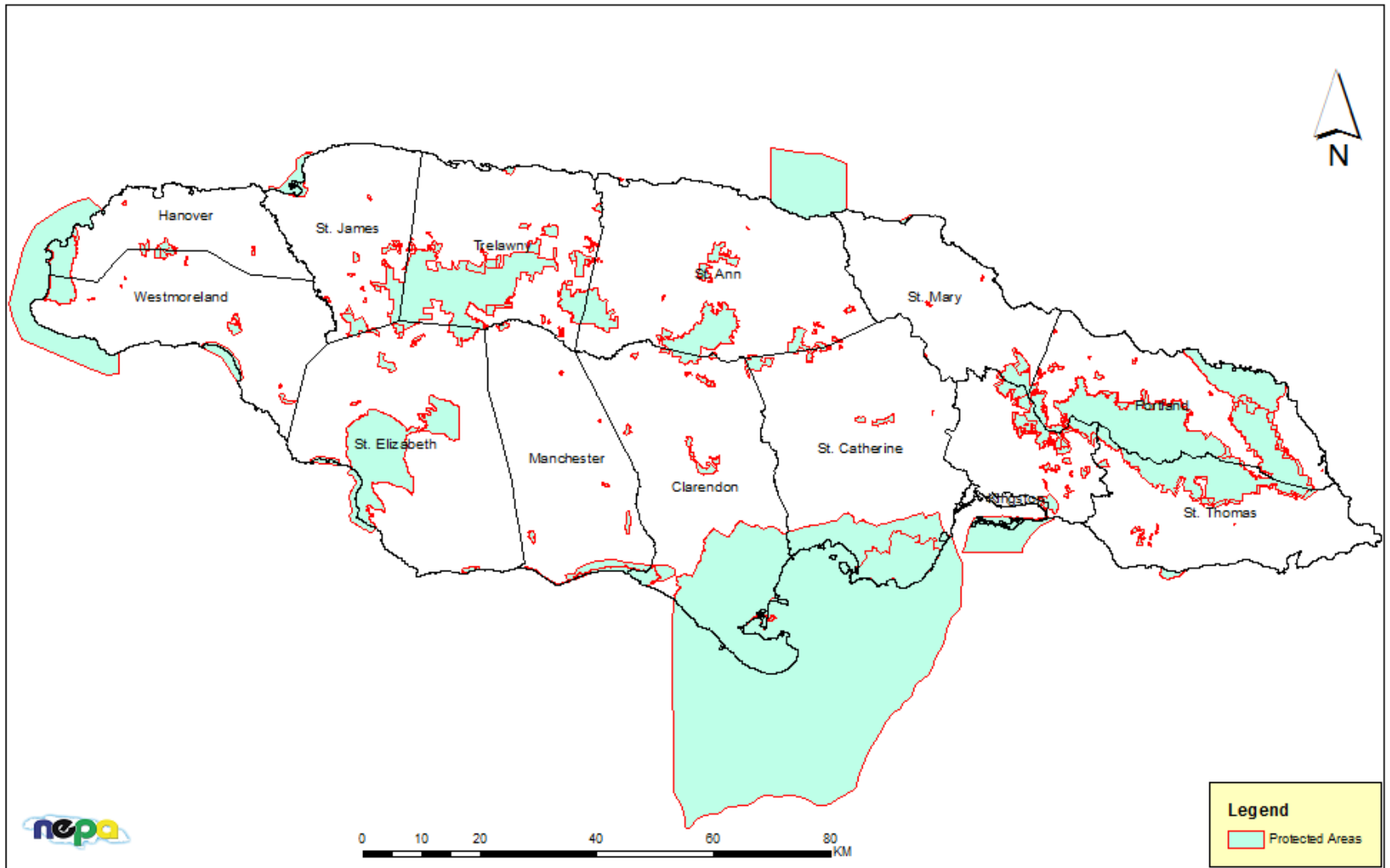
Map of Jamaica



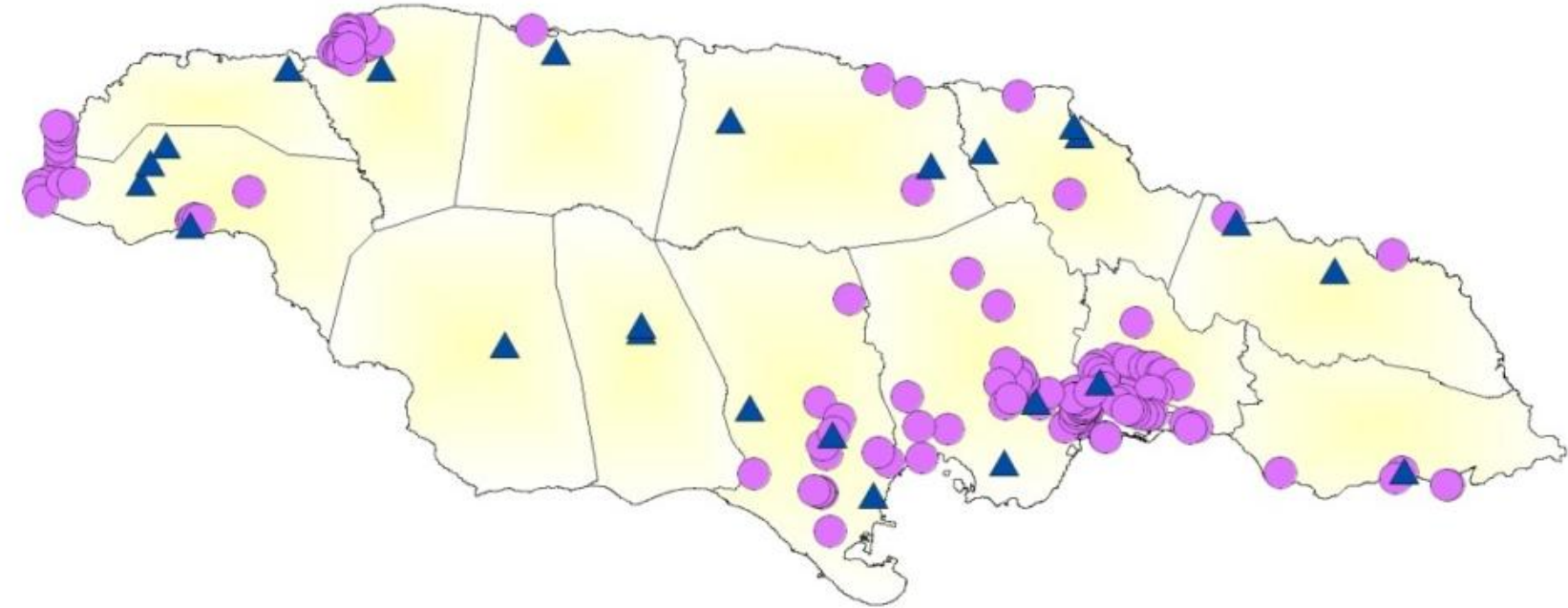
Watersheds Management Units



Map of Protected Areas



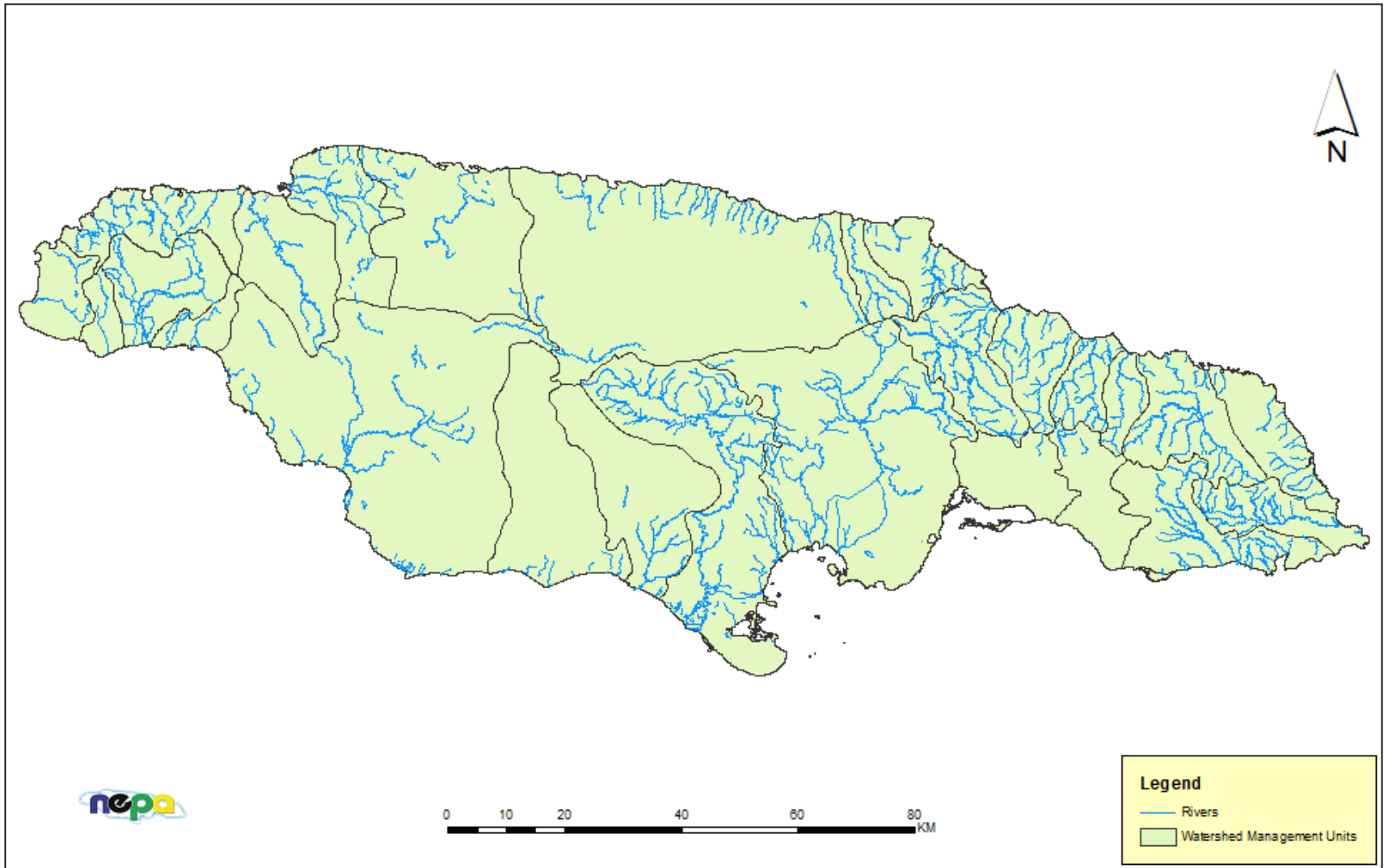
Waste Disposal Sites



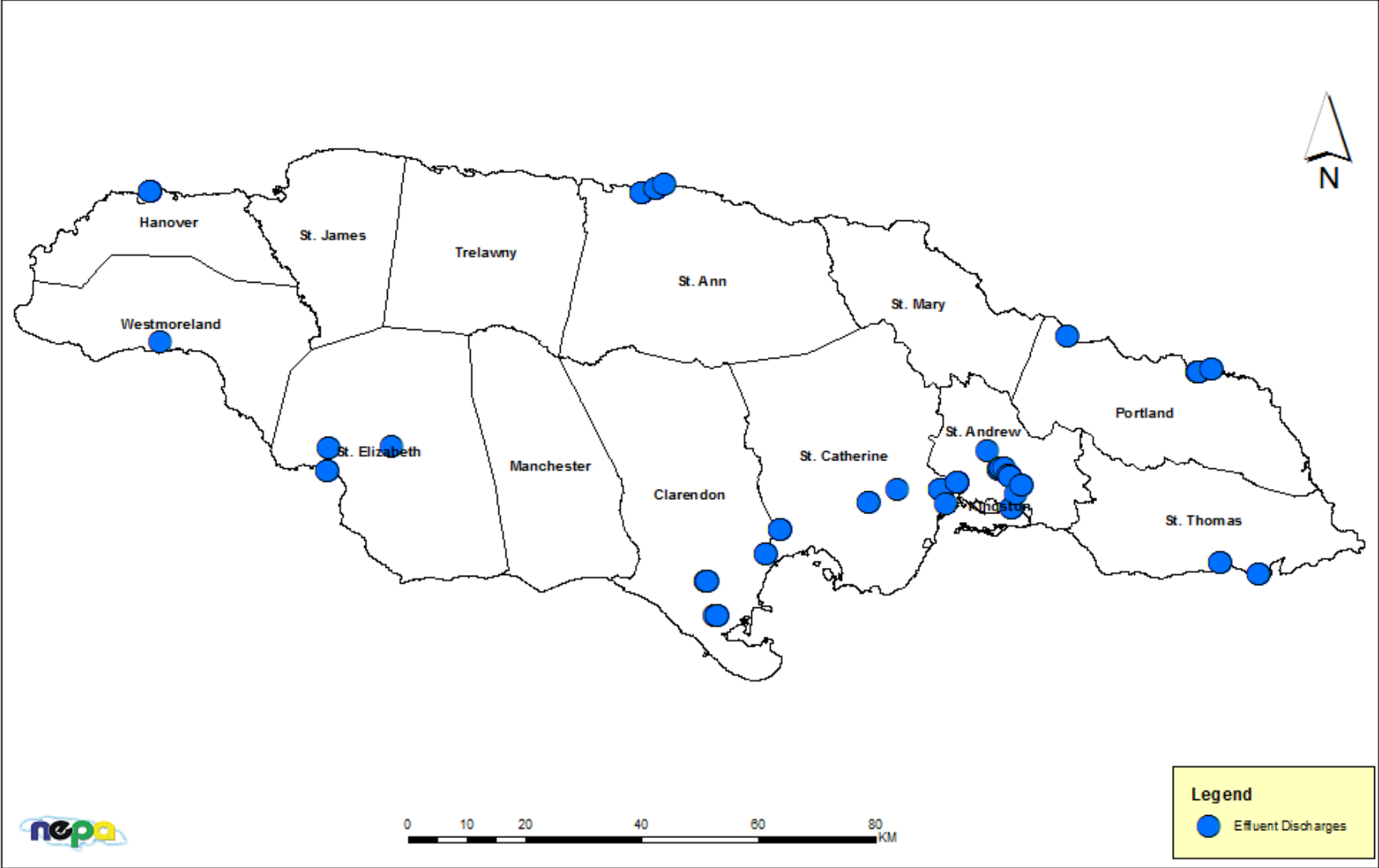
Legend

- ▲ Solid waste disposal_sites
- Waste_water_facilities_NWC
- Parishes

Maps showing Rivers



Map Showing Effluent Discharges to Date



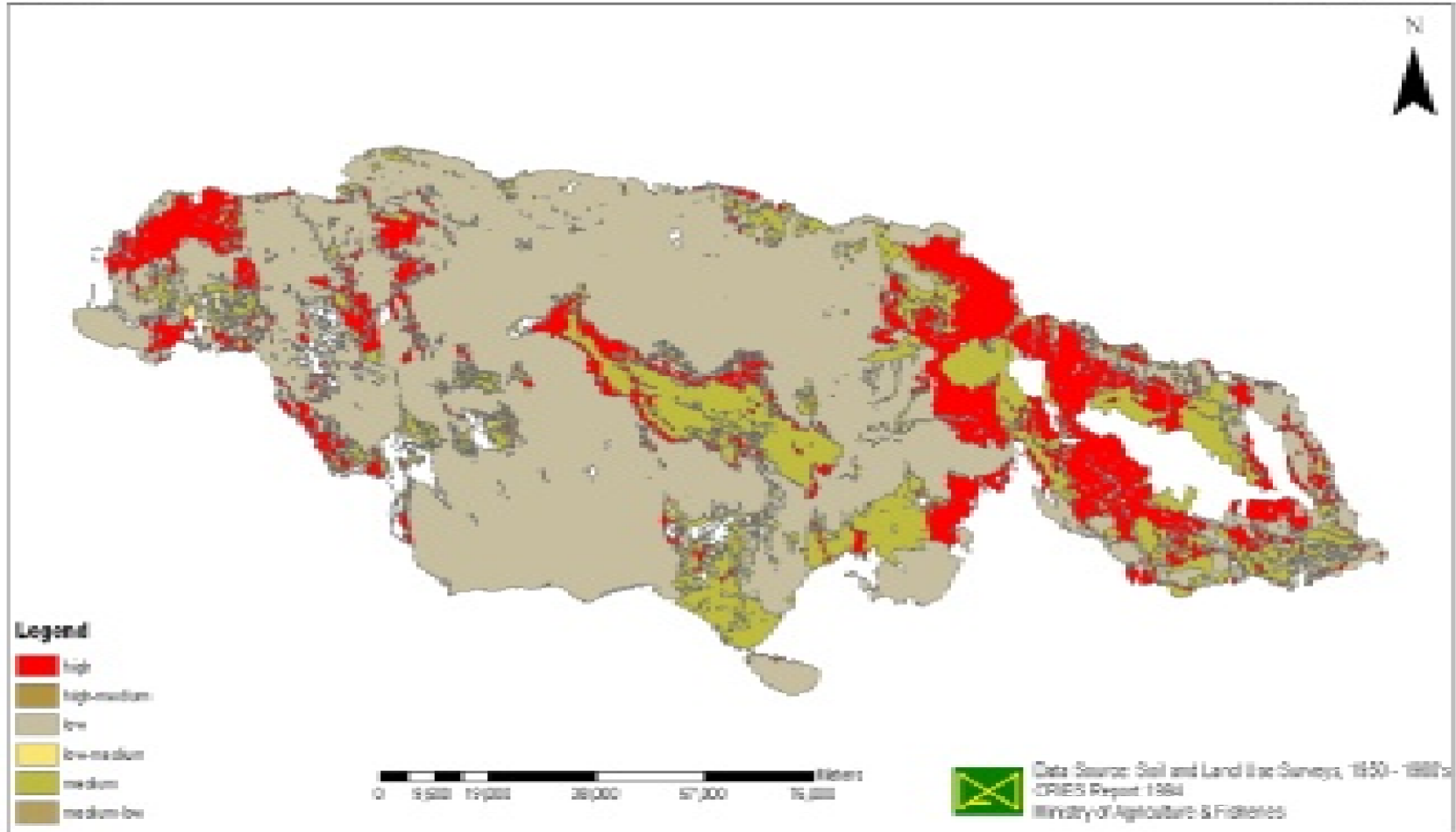
Jamaica's Water Quality Monitoring Sites



Generalized Map of Phosphorus Levels

Jamaica

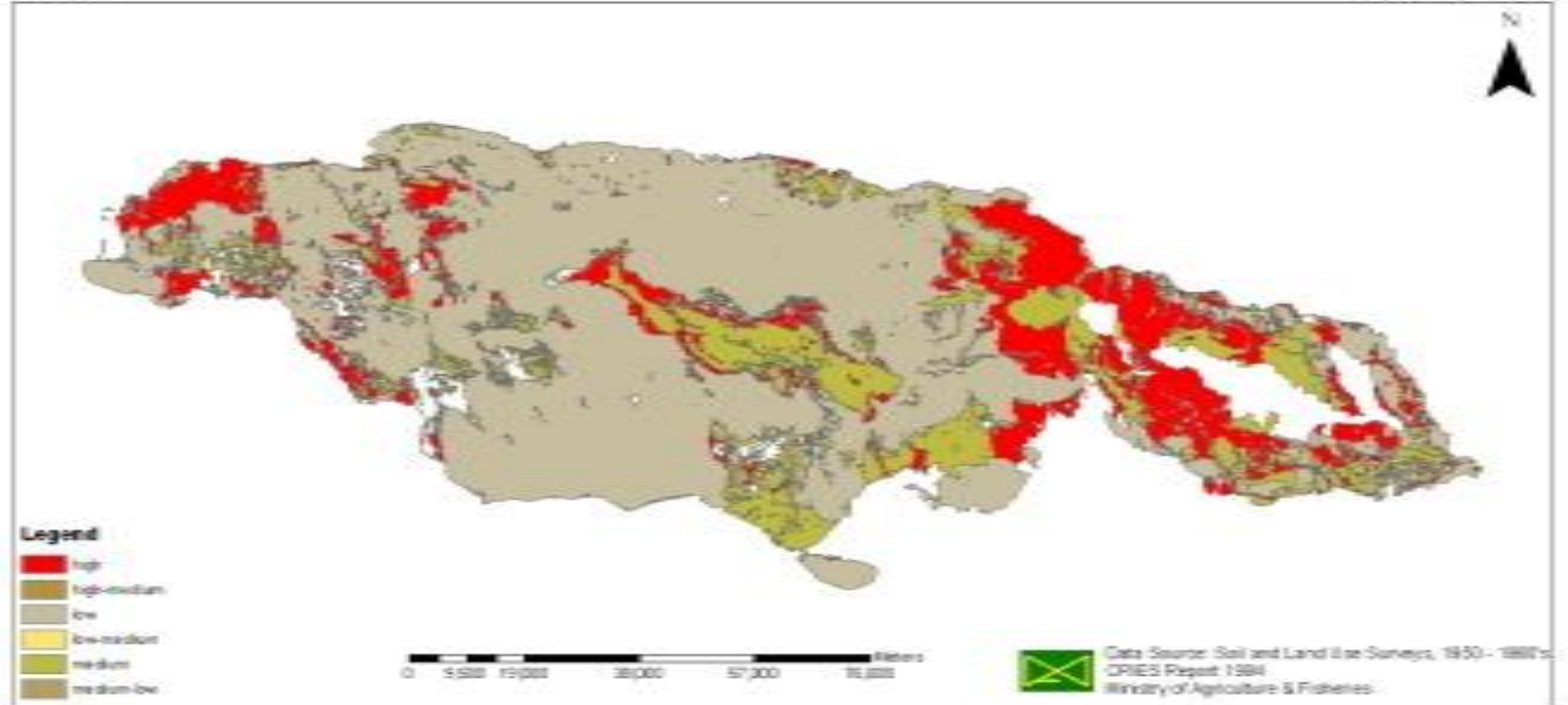
Scale 1:750000



Generalized Map of Phosphorus Levels

Jamaica

Scale 1:750000



Context for Nutrient Management in Jamaica

- Eutrophication of water resources – surface and coastal
- Incidents of Fish Kill s in Surface and Coastal Areas
- High level of nutrients contained in raw and poorly treated Wastewaters (Sewage Effluent, Trade (Industrial) Effluent and Sludge}
- Reuse for selected land applications more beneficial than costly tertiary treatment

Value of Wastewater Products as Nutrient Source

Wastewater contains valuable resources such as

- Organic matter , Nutrients and Water

It may also contain varying concentration levels of:

- chemical contaminants – nitrates, phosphates, metals, organic compounds, chlorides, sulphates
- pathogens that are potentially detrimental to soils or plant growth and/or
- pose a risk to the wider environment and public health

Initiatives and Actions Taken in Jamaica To Minimize Pollution of The Natural Resources

- Policies
- Legislation
- Collaborate with Government Agencies and Industry

Policy Framework

- Voluntary Compliance
- Standards to protect the natural resource
- Collaboration with Stakeholders

Voluntary Compliance

Promotion of

- Environmental Stewardship
- Environmental Management Systems
- Reuse of Treated Wastewater and Sludge

Standards Developed

- Ambient Freshwater Water Quality Standards
- Ambient Coastal Water Quality Standards
- NRCA Trade Effluent Standards
- NRCA Sewage Effluent Standards
- NRCA Sewage Irrigation Standards
- NRCA National Treated Sewage Sludge/Biosolids Standards

Reuse of Treated Wastewater Products

- Nutrient Management Plans
- Land Application for Reuse of Effluent and Sludge under specific conditions
- Licensing arrangement for wastewater reuse under stipulated conditions

Collaboration with Industry Consumers and Regulators

- Elimination of Phosphates in Detergents –
by amendment of the Commodity
Standard Phosphate in Synthetic laundry
Detergent (JS 73)

Legislative Framework

- The Natural Resources Conservation Authority Act, 1991
 - NRCA Permits & Licences Regulations
 - NRCA Wastewater and Sludge Regulations (2013)
- The Beach Control Act, 1956
- The Town and Country Planning Act, 1958

Legislative Framework

- Watershed Protection Act, 1945
- Endangered Species (Protection, Conservation and Regulation of Trade) Act, 2000
- The Water Resources Act
- The Public Health Act
- Wildlife Protection Act, 1945
- Access to Information Act

Legislative Framework

- Ministry of Agriculture Act
- National Irrigation Commission Act

Institutional Arrangements

- National Environment and Planning Agency
- Water Resources Authority
- Ministry of Agriculture and Fisheries
 - Rural Physical and Planning Department
 - National Irrigation Commission
 - Rural Agricultural Development Authority
- Jamaica Bureau of Standards
- Ministry of Health
 - Environmental Health Unit
 - Environmental Health Laboratory

Factors to Consider for Land Application

- Sustainable use of the land in the long term – avoiding build-up of substances in the soil
- Soil type (physical structure and chemical)
- Soil structure - potential for runoff to surface waters, percolation to groundwater (adsorptive capacity)
- Slope stability
- Land area for fertigation and/or irrigation
- Precipitation and evaporation pattern

Factors to Consider for Land Application

- Type of crop and growth rate (nutrients requirement at different stages in the growth cycle)
- Location of the land and identification of any relationship with sensitive ecosystems
- Buffer zones
- Effect, if any, of the effluent on the vegetative cover
- Pollutant loading including agro-chemical loading of the receiving environment

Factors to Consider for Land Application

- Source and quality of the effluent
- Nutrient levels in the effluent
- Potential for effluent reuse
- Wastewater quantity
- Application rate to the soil
- Moisture content in soil
- Reliability of supply

Factors to Consider for Land Application

- Method of managing the operation (how, when, where, what to apply the wastewater)
 - » Mechanisms for sampling,
 - Moisture content in soil
 - Monitoring and reporting to regulators and
 - Potential for gaseous emissions to cause nuisance odour.

Factors to Consider for Land Application

- Changes in the characteristics of the product, effluent and/or sludge, due to:
 1. changes in the treatment process
 2. changes in the sewage or trade effluent being treated
- Reporting requirement from end-user
 - Time intervals, Format and
 - Nature of the information

Mechanism for Reuse of Wastewater and Sludge

- Approval process guided by legislative mandates of the regulatory agencies involved
 - Preparation of Nutrient Management Plan by Applicant
- Assessment of Efficacy by Regulators
- Reporting Regime
- Compliance Monitoring
- Enforcement and Legal actions

Management of Nutrients in Wastewater

Limit the concentrations in effluent discharges

- Maximum permissible levels in Sewage Effluent for

Total Nitrogen	10 mg/L
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Phosphates	4 mg/L
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Management of Nutrients in Wastewater

- Maximum permissible Limit in Industrial Effluent
 - Phosphates 5 mg/L
 - Nitrates 10 mg/L
- Limits in Sewage Irrigation Standards
 - Rous
 - Fael Coliform 12 MPN/100 mls

Management of Nutrients in Sludge

Sludge derived from treated sewage and industrial effluent permitted for Agricultural Applications

- No limits for Nitrogen and Phosphorous
- Limits for organic compounds and metals

Nutrient Management Plan

- To use sewage products as soil conditioner ('fertilizer') requires an approved nutrient management plan that contains the following:
- An aerial photograph or map,
- A soil map of the fields on which it is proposed to apply effluent derived fertilizer with each field distinguishable with a unique identification (ID) number
- A current and/or planned crop production sequence or crop rotation.

Nutrient Management Plan

- Analytical results for samples of soil, plant, water, manure or organic by product.
- Realistic yield potentials for crops in the rotation.
- A quantification (listing) of all nutrient (fertilizer) sources.
- Recommended nutrient rates, timing, form and method of application including incorporation of timing for the time period of the plan.

Nutrient Management Plans

- Location of designated sensitive areas or resources and the associated nutrient management restriction.
- Guidance for implementation, operation, maintenance, record keeping, and complete field-by-field nutrient budget for nitrogen, phosphorus, and potassium for the rotation or crop sequence.
- A statement that the plan was developed based on current standards and that changes in any of these requirements may necessitate a revision of the plan.

Reporting by Owners of Landfill and Other Sewage Disposal Sites

- Approval required for sewage sludge that does not satisfy the National Treated Sewage Sludge/Biosolids Standards for application to agricultural land for disposal in a licensed landfill or other locations approved
- Monthly analytical data for sludge
- Leachate quality

General Reporting Requirements

- Regular effluent monitoring
- Report in the event of plant malfunction
- Report in the event of an emergency
- Report in the event of transfer in ownership
- Report in the event of major maintenance or upgrade
- Report for Pollution incidents
- Compliance Plan reports

Thank You For Your Kind Attention

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